

FAQ • 07/2015

Connecting a PC Station to an S7-1200 using OPC

TIA Portal

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1 Introduction

This entry shows you how to configure an S7-1200, a PC station and an S7 connection in the TIA Portal so that you can exchange data between the stations over Industrial Ethernet.

Note In the TIA Portal you need STEP 7 Professional, because with STEP 7 Basic you cannot configure a PC station, but only the SIMATIC S7-1200.

2 Procedure for S7-1200 up to firmware V3

This chapter shows:

- How you configure an SIMATIC S7-1200 and a PC station in TIA Portal
- How you project an S7 connection for data exchange between SIMATIC S7-1200 and PC station

Creating a Project

- In Windows, select the command "Start > All Programs > Siemens Automation > TIA Portal V12" to start the TIA Portal.
- In the Portal view, select the "Create new project" action.
- Enter the project name in the appropriate field.

Figure 2-1

MA Si	emens				
s	tart			Create new project	
		<u>ر</u>	Open existing project		S7 communication
			Create new project Migrate project	Author: Comment:	User
			Close project		
		1			
	Online & Diagnostics	~~	Welcome Tour First steps		

Click the "Create" button to create a new project. Figure 2-2

Create new pr	oject			
	Project name:	S7 communication		
	Path:	D:\Projects	-	
	Author:	User		
	Comment:			
				Create

Switch to Project View

Figure 2-3			
Mag Siemens - S7 communication			
Start		First steps	
Devices & networksImage: Constraint of the second	 Open existing project Create new project Migrate project Close project Close project Welcome Tour First steps 	Project: "\$7 communication" was opened such Start Devices & PLC programming Motion & technology	cessfully. Please select the next step: Configure a device Write PLC program Configure technology objects
	 Installed software Help 	→ Visualization → Drive parameterization	Configure an HMI screen Parameterize drive
	S User interface language	Project view	Open the project view
Project view	Opened project: D:\Projects\S7 com	munications/ communication	

Use the "Project View" link to switch to the Project View.

2.1 Configuration of the S7-1200

You configure your S7-1200 station in the TIA Portal. Then you create the user program and define which data is to be monitored over the S7 connection of the OPC server.

2.1.1 Configuring the Hardware

Add an S7-1200 Station

In the project tree, double-click the "Add new device" item. The "Add new device" dialog opens.

Figure 2-4

恐	Siemens - S7 communication	
Pr	oject Edit View Insert Online Options Tools Window He	lp
2	🎙 🎦 🖬 Save project 🚇 🐰 🤨 🏛 🏹 🐴 🔛	1
	Project tree	1
	Devices	
	B O O E	ł
	▼ 🔄 S7 communication	
Start	Add new device	
St	🚠 Devices & networks	

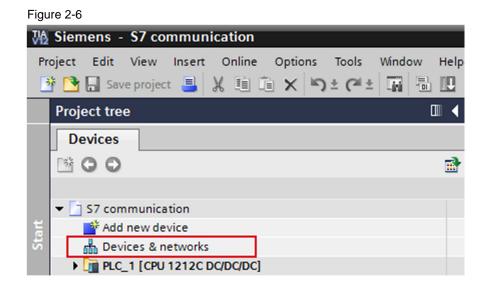
Click the "Controllers" button in the working area. Go to "Controllers > SIMATIC S7-1200 > CPU" and select the required controller. Click the "OK" button to add the selected S7-1200 CPU to your project.

F	igure	2-5

Add new device			×
Device name:			
PLC 2		1	
FLC_5			
PLC_3	 Controllers SIMATIC S7-1200 CPU CPU 1211C AC/DC/Rly CPU 1211C DC/DC/DC CPU 1211C DC/DC/Rly CPU 1212C AC/DC/Rly CPU 1212C DC/DC/DC 6ES7 212-1AE31-0X80 CPU 1214C AC/DC/Rly CPU 1214C AC/DC/Rly CPU 1214C AC/DC/Rly CPU 1214C DC/DC/Rly CPU 1215C AC/DC/Rly CPU 1215C DC/DC/Rly CPU 1215C DC/DC/Rly CPU 1215C DC/DC/Rly CPU 1215C DC/DC/Rly SIMATIC S7-1500 SIMATIC S7-300 SIMATIC S7-400 SIMATIC ET 200 CPU 	DI8 x 24VDC on board; 4 ł with digital s board; signa 3 communicat communicat expansion; 0	CPU 1212C DC/DC/DC 6ES7 212-1AE31-0XB0 V3.0
Open device view			OK Cancel

Define IP address and assign subnet

In the project tree, double-click the "Devices & networks" item. The devices and networks editor opens.



In the Network View or Device View of the devices and networks editor you click the PROFINET interface of the S7-1200 CPU.

In the inspector window you switch to the "Properties" tab. Select the "Ethernet addresses" item in the area navigation.

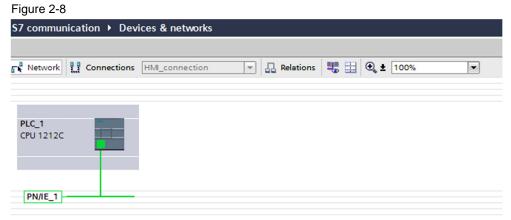
In this example you enter the IP address 172.16.43.1 and the subnet mask 255.255.0.0 for the PROFINET interface of the S7-1200 CPU.

Then assign a subnet to the PROFINET interface. Click the "Add new subnet" button to insert a new subnet.

Fig	ure	2-7
FIG	ure	2-1

PLC 1 CPU 1212C			
PROFINET interface_1 [X1 : PN	(LAN)]	Server Server	ties
General IO tags Sys	stem constants Texts		
General Ethernet addresses Advanced options Time synchronization Hardware identifier	Ethernet addresses Interface networked wit		
	IP protocol	 Set IP address in the project IP address: 172.16.43.1 Subnet mask: 255.255.0.0 Use router Router address: 0.0.0.0 IP address is set directly at the device 	

The connection between the subnet, PN/IE_1, for example, and the S7-1200 is now displayed in the "Network View" of the devices and networks editor.



2.1.2 Creating a User Program

Add a data block

In the project tree, navigate to the device folder of the S7-1200 CPU, "PLC_1 [CPU 1212C ...]", for example. The device folder contains structured objects and actions that belong to the device.

In the device folder you navigate to the "Program blocks" subfolder and doubleclick the "Add new block" action. The "Add new block" dialog opens. Figure 2-9

rigu	lie 2-9	
	Project tree	
	Devices	
		
Devices & networks		
R.	👻 🛅 S7 communication	
Ĕ	💕 Add new device	
8	Devices & networks	
<u> </u>	PLC_1 [CPU 1212C DC/DC/DC]	
ev l	Device configuration	
	🗓 Online & diagnostics	
	🕶 🕁 Program blocks	
	Add new block	
	= Main [OB1]	

Click the "DB Data block" button. Enter the name of the data block and enable the "Manual" option to assign the number of the data block manually. If you enable the "Automatic" option, the number of the data block is assigned automatically.

Apply the settings with "OK".

The data block DB1 "Data block 1" is used in this example.

Add new block				×
Name:				
Data_block_1]	
			-	
	Type:	🧧 Global DB 💌]	
OB	Language:	DB		
Organization block	Number:	1]	
		🔿 manual		
		💿 automatic		
FB	Description:			
Function block			program which contain user data.	
	Select one of the - A global data blo	ock		
	- An instance data	a block		
FC				
Function				
Data block				
	more			
> Additional inform	nation			
🛃 Add new and open			ОК	Cancel

In the Properties of the data block you go to "Attributes" and disable the "Optimized block access" option.

Data blocks with standard access have a fixed structure. The data elements in the declaration include both symbolic names and a fixed address in the block. The address is displayed in the "Offset" column. You can address the tags in this block both symbolically and absolutely.

ata_block_1 [DB1] General	
General Information Time stamps Compilation Protection Attributes	Attributes Only store in load memory Data block write-protected in the device Optimized block access
	OK Cancel

- . -

Define static tag in the data block

Define the static tag "static_01" of the "Bool" data type in the DB1 "Data block 1". Click the "Compile" button.

Project tree	□ ◀	S 7	cor	nm	unication 🕨 PL	C 1 [CPU 1	212C D	DCDC/DC1
Devices								
B 0 0	1	lill.	ÿ ≣	ž	🎭 🛃 🗮 🛤	R- B- 🗄		10 ⊳
			Da	ta_	block_1			
 S7 communication 				Nar	ne	Data type	Offset	Start value
💕 Add new device		1		•	Static			
🛗 Devices & networks		2		•	static_01	Bool	0.0	false
PLC_1 [CPU 1212C DC/DC/DC]		3		•	<add new=""></add>			
Device configuration								
🛂 Online & diagnostics								
🕶 🔂 Program blocks								
📑 Add new block								
Hain [OB1]								
Data_block_1 [DB1]								

Create Main [OB1]

In the "Program blocks" folder, you double-click the "Main [OB1]" block to open the corresponding dialog window.

Project tree	
Devices	
	B
🕶 🛅 S7 communication	
💕 Add new device	
Devices & networks	
PLC_1 [CPU 1212C DC/DC/DC]	
Device configuration	
😵 Online & diagnostics	
🕶 🔂 Program blocks	
🌁 Add new block	
📲 Main (OB1)	
Data_block_1 [DB1]	

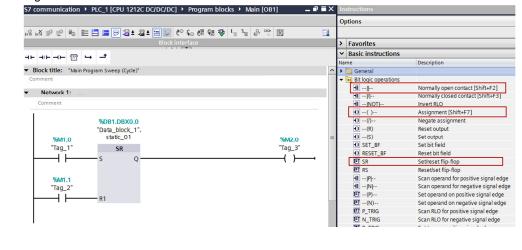
Create the program as shown in <u>Figure 2-14</u>. The bit links are in the "Instructions" task card under "Basic instructions > Bit links".

Use drag-and-drop to add the normally open contact, the flip-flop and the Assignment to Network 1 of the "Main [OB1]" block.

Assign the tags below to the flip-flop, to the normally open contact at inputs S and R of the flip-flop and to the assignment at output Q of the flip-flop.

Table	2-1

Variable	Description
M1.0	SR flip-flop input S: NO contact
M1.1	SR flip-flop input R: NO contact
DB1.DBX0.0	SR variable
M2.0	SR flip-flop output Q: Assignment



Note The "%" character before the absolute address is added automatically by the TIA Portal.

Click the "Compile" button.

2.2 Configuring the PC Station

Before you start configuring the PC station in the TIA Portal, determine or change the IP address of the network card that you are using in your PC station. You enter the IP address and subnet mask of the network card when you configure the PC station in the TIA Portal.

Determine and change the IP address and subnet mask of the network card

In Windows you open the "Network and Sharing Center" and select the "Change adapter settings" functions. Open the Properties dialog of the network card to which the S7-1200 is connected.

In this example the network card receives the IP address 172-16.40.11 and subnet mask 255.255.0.0.

Note The IP address configured for the PC station in the TIA Portal must match the IP address set in Windows. If you are not using a router, the IP addresses of the PC station and the S7-1200 CPU must be in the same subnet.

Internet Protocol Version 4 (TCP/IPv4)	Properties
General	
You can get IP settings assigned auton this capability. Otherwise, you need to for the appropriate IP settings.	
Obtain an IP address automatical	ly .
O Use the following IP address:	
IP address:	172.16.40.11
Subnet mask:	255.255.0.0
Default gateway:	172.16.0.1
Obtain DNS server address autom	natically
O Use the following DNS server add	resses:
Preferred DNS server:	172.16.0.1
Alternate DNS server:	· · ·
Validate settings upon exit	Advanced
	OK Cancel

Add a PC Station

In the TIA Portal you open the project that contains the configuration for the S7-1200 station.

In the project tree, double-click the "Add new device" item. The "Add new device" dialog opens.

ie 2-10	
Siemens - S7 communication	
	ielp D
Project tree	•
Devices	
 S7 communication 	
Add new device	
📅 Devices & networks	
PLC_1 [CPU 1212C DC/DC/DC]	
	Siemens - S7 communication oject Edit View Insert Online Options Tools Window H Save project

Click the "PC systems" button in the working area. Go to "PC systems > PC general" and select the "PC station" item.

Click the "OK" button to add a PC station named "PC Station" to your project.

Open the "Device View" of the PC station in the devices and networks editor

In the project tree, navigate to the device folder of the PC station, "PC Station [PC station]", for example. The device folder contains structured objects and actions that belong to the device.

In the device folder double-click the "Device configuration" object to open the "Device View" of the devices and networks editor.

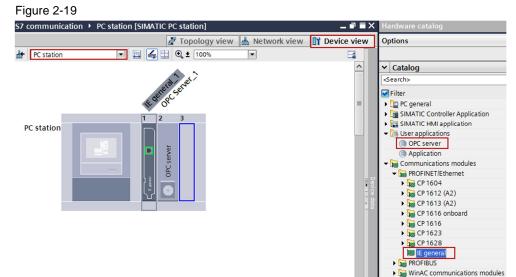


	B
 S7 communication 	
📑 Add new device	
🚠 Devices & networks	
Image: PLC_1 [CPU 1212C DC/DC/DC]	
PC station [SIMATIC PC station]	
Device configuration	
. Online & diagnostics	
🕨 🥁 Common data	
Documentation settings	
Languages & resources	
Image: Contract of the second seco	
Eard Reader/USB memory	

Configure user application and communication module of the PC station

In the hardware and network editor you select the Device view. Here you configure and parameterize the modules of the PC station.

The "Hardware catalog" task card contains the user applications and communication modules that you can configure in the PC station. Using drag-and-drop you add the "IE General" communication module to Slot 1 and the "OPC server" user application to Slot 2 of the PC station.



Define IP address and assign subnet

In the project tree, double-click the "Devices & networks" item. The devices and networks editor opens.

Figure 2-20	
Project tree	
Devices	
🖻 O O	
 57 communication 	
Add new device	
Devices & networks	
PLC_1 [CPU 1212C DC/DC/DC]	
PC station [SIMATIC PC station]	
🕨 🥁 Common data	
Documentation settings	
Languages & resources	
Image: Online access	
Card Reader/USB memory	

In the Network View or Device View of the Devices and Networks editor you click the PROFINET interface of the network card in the PC station.

In the inspector window you switch to the "Properties" tab. In the area navigation select the "Ethernet addresses" item.

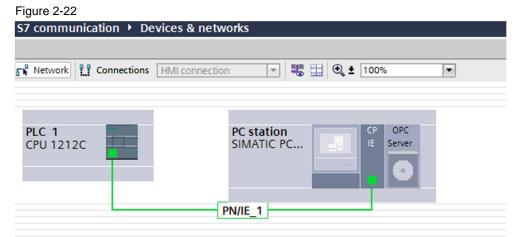
In this example you enter the IP address 172.16.40.11 and subnet mask 255.255.0.0 for the network card.

Select the subnet that you have already assigned to the S7-1200 CPU and assign it also to the network card of the PC station.

Figure 2-21		
S7 communication ► PC stati	on [SIMATIC PC station]	9 Tenelemuie
H PC station) 🖽 🕼 🗄 🔍 ± 100%. 💌	🚽 Topology vie
	Konerd , eret	
PC station		
<		
PROFINET interface [Module]		Server Properties
	em constants Texts	
General Options	Ethernet addresses	
Ethernet addresses	Interface networked with	
Advanced options	Subnet: PN/IE_1 Add new subnet	
	ISO protocol	
	Use ISO protocol	
-	MAC address: 08 -00 -06 -01 -00 -00	
	IP protocol	
	Use IP protocol	
	IP address: 172.16.40.11	
	Subnet mask: 255.255.0 .0	
	Use router Router address: 0 , 0 , 0 , 0	
	Router address: 0.0.0.0	

Note The IP address configured for the PC station in the TIA Portal must match the IP address set in Windows. If you are not using a router, the IP addresses of the PC station and the S7-1200 CPU must be in the same subnet.

The connection between the subnet, PN/IE_1, for example, and the S7-1200 and the PC station is now displayed in the "Network View" of the Devices and Networks editor.



2.3 Configuring the S7 Connection

2.3.1 Adding the S7 Connection

In the project tree, double-click the "Devices & networks" item. The devices and networks editor opens. Switch to the Network view.

In the toolbar of the Network View, click the "Connections" icon to switch to the mode for setting the connections.

In the drop-down list box you select "S7 connection" as connection type.

Figure 2-23
S7 communication > Devices & networks
💦 Network 🔡 Connections S7 connection 💌 💐 🖽 🍳 ± 100% 💌
4 Highlighted: Connection
PLC 1 PC station CP OPC
CPU 1212C SIMATIC PC
S7_Connection_1

In the graphical area of the Network View, click the OPC server in the PC station and connect it to the S7-1200 CPU.

In the Network View, the S7 connection is displayed in the graphical area and in the "Connections" table in the table area.

Net	work overview	Connections	I/O communic	ati VP	N	
'	Local connection name	Local end point	Local ID (hex)	Partner ID (hex) Partner	Connection type
	S7_Connection_1	PLC_1	100	S7_Connectio	🊾 OPC Server_1	S7 connection
	S7_Connection_1	OPC Server 1	S7 Connection 1	100	PLC_1	S7 connection

2.3.2 Displaying and Changing Properties of the S7 Connection in the Inspector Window

Proceed as described below to have the properties of the S7 connection displayed in the inspector window.

- In the table area switch to the "Connections" table and select the configured S7 connection.
- In the inspector window you switch to the "Properties" tab.

General properties

In the area navigation select the "General" item to display the connection path.

The S7 connection is between the OPC server and the S7-1200 CPU.

Figure 2-25

_								
	Network overview	Connections I/O	communicati	VPN				
2	Y Local connection nan	ne Local end point Local	ID (hex) Partn	er ID (hex)	Partner	Connection type		
X A	S7_Connection_1	PLC_1 100	S7_0		OPC Server_1	S7 connection		
IMO	S7_Connection_1	OPC Server_1 S7_C	onnection_1 🔳 100		PLC_1 💌	S7 connection		
ž								
\$ 7	_Connection_1 [S7 connection_1	ection]						💁 Properties 📑
(General IO tags	System constants T	exts					
	General	General						
	ocal ID pecial connection prop							
	Address details	Connection						
	OPC	Name:	S7_Connection_1					
		Connection path						
			·					
			Local					Partner
			OPC Server					
			-					
			•					
		End point:	OPC Server_1					PLC_1
		Interface:	IE general_1, PROFIN	NET interface	[IE1]		•	PLC_1, PROFINET interface_1[X1 : PN(LAN)]
		Interface type:	Ethernet					Ethernet
		Subnet:						PN/IE_1
			172.16.40.11				= -	172.16.43.1
		/iddicos.						

In the area navigation select the "Special connection properties" item.

Here you see a display of the special connection properties of the local end point, "Active connection establishment", for example.

In this example, the OPC server establishes the S7 connection. The communication partner, S7-1200 CPU, is participates passively in establishing the connection.

	Network overview	Connections	I/O communicati	VPN					
š –	Y Local connection name	Local end point	Local ID (hex)	Partner ID (hex)	Partner	Connection type			
× -	S7_Connection_1	PLC_1	100	S7_Connection_1	OPC Server_1	S7 connection			
I MO	S7_Connection_1	OPC Server_1	S7_Connection_1	100	PLC_1 💌	S7 connection			
Per l									
\$7_Co	nnection_1 [S7 connect	ion]							
Gen	eral IO tags Sys	stem constants	Texts						
Gene		Special co	onnection properti	es					
Spec	ial connection properties ess details	Local er	Local end point						
OPC		One-v	vay						
ore			Active connection establishment						
ore		Active	connection establishm	nent					

In the area navigation select the "Address details" item.

Here you have a display of the local end point, the partner end point and the TSAP of both end points.

Figure 2-27

Network overview	Connections	I/O communicati.	VPN					
- 🍟 Local connection name	Local end point L	ocal ID (hex)	Partner ID (hex)	Partner	Connection type			
57_Connection_1	PLC_1 1	00	S7_Connection_1	OPC Server_1	S7 connection			
57_Connection_1	OPC Server_1 S	7_Connection_1 🔳	100	PLC_1 💌	S7 connection			
7_Connection_1 [\$7 connect	ion]						Server ties	<u>i</u> li
	stem constants	Texts						
General Local ID	Π	tails						
Special connection properties Address details		Local				Part	tner	
OPC	E	nd point: OPC Serve	r_1			PLC	1	
		Rack/slot:	-			0		1
	Connec	(hex): 10				▼ 10		
		TSAP: 10.12					1	
		SIMATI	C-ACC			SI 🗌 SI	MATIC-ACC	
	Su	ubnet ID: 3D94 - 000	01			3D94	4 - 0000 - 0001	

2.4 Compiling and Downloading the Configuration and User Program of the S7-1200

Compile

In the project navigation you mark the device folder of the S7-1200 CPU. Click the "Compile" button in the toolbar. The hardware configuration and the software of the S7-1200 are compiled.

Figure 2-28 M Siemens - S7 communication Project Edit View Insert Online Options Tools Window Help 📑 🎦 🔚 Save project 昌 🐰 🗉 👔 🗙 🏹 🛨 (~ 🛨 🌆 🖥 🖳 🌆 🖳 **Project tree** Devices 🖻 🖸 🖸 Compile R S7 communication 🍄 Add new device H Devices & networks PLC_1 [CPU 1212C DC/DC/DC] PC station [SIMATIC PC station] Common data Documentation settings Languages & resources Online access Card Reader/USB memory

Download

In the project navigation you mark the device folder of the S7-1200 CPU. Click the "Download to device" button in the toolbar. The hardware configuration and the software are downloaded to the S7-1200 CPU.

Figure 2-29

Via	Siemens - S7 communication
	oject Edit View Insert Online Options Tools Window Help * 🎦 🖬 Save project 昌 💥 🗎 🗎 🗙 🏹 ± 🎮 🖬 🛄 🗊 🖳 😭
	Project tree
	Devices
	🖻 🖸 🖸 Download to device 📑
Start	 S7 communication Add new device Devices & networks PLC_1 [CPU 1212C DC/DC/DC] PC station [SIMATIC PC station] Common data Documentation settings Languages & resources Online access
Start	Add new device Add new device Devices & networks Plc_1 [CPU 1212C DC/DC/DC] Common data Documentation settings Canguages & resources

The "Extended download to device" dialog opens. Check the settings below:

- PG/PC interface type
- PG/PC interface
- Connection with the subnet

Under "Compatible devices in target subnet" you select the relevant device and click the "Load" button.

		ess nodes of "PLC_1"					
	Device	Device type	Slot Typ		Address		Subnet
—	PLC_1	CPU 1212C DC/D	1 X1 PN	/IE	172.16.43.1		PN/IE_1
		Туг	e of the PG/PC PG/PC	interface: interface:	PN/IE	577LM Giga	▼ abit ▼ 💎
			Connection t	to subnet:	PN/IE_1		- 💎
		ices in target subnet:		t gateway:	0		
	Compatible dev Device plc_1	ices in target subnet: Device type \$7-1200	Type PN/IE	Add	Sh Iress 2.16.43.1	now all com Target d	patible device
ант так Р — 14	Device	Device type	Туре	Add	Iress	Target d	patible device
ar and F and F	Device plc_1	Device type \$7-1200	Type PN/IE	Add	Iress 2.16.43.1	Target d	patible device
Flash LED	Device plc_1	Device type \$7-1200	Type PN/IE	Add	Iress 2.16.43.1	Target d	patible device
Flash LED	Device plc_1	Device type \$7-1200	Type PN/IE	Add	Iress 2.16.43.1	Target d	patible device
	Device plc_1 -	Device type \$7-1200	Type PN/IE	Add	Iress 2.16.43.1	Target d	patible device
Flash LED	Device plc_1 -	Device type \$7-1200	Type PN/IE	Add	Iress 2.16.43.1	Target d	patible device
ne status informati A device was deter	Device plc_1 - - - - - - - - - - - - -	Device type \$7-1200 -	Type PN/IE PN/IE	Add	Iress 2.16.43.1	Target d	patible device

Note

If the project has already been loaded once into the S7-1200 CPU, the "Load preview" dialog is opened immediately instead of the "Extended download to device" dialog.

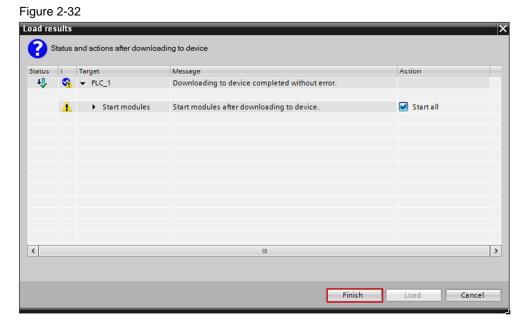
The "Load preview" dialog opens.

- Select the "Stop all" action to stop the modules for loading into the device.
- The device configuration is downloaded into the target device (S7-1200 CPU).
- The software is downloaded consistently into the target device (S7-1200 CPU). Click the "Load" button.



tatus				Action			
† ∐	• - , , ,						
	0	Sto	p modules	The modules are stopped for downloading to de	evice.	Stop all	-
	💙 🔹 Device configurati		vice configurati	Delete and replace system data in target		Download to de	vice
	0	▶ Soft	tware	Download software to device		Consistent down	nload
د 🗌				III			>

The dialog box containing the results of the download procedure opens. If the S7-1200 is in "STOP" mode for the download procedure, check the "Start all" check box. Click the "Finish" button. The status LED of the S7-1200 CPU indicates the "RUN" mode after downloading.



2.5 Compiling and Downloading the PC Station Configuration

Open the Station Configuration Editor

Open the Station Configuration Editor with the icon in the Windows taskbar.



Insert the modules, namely the OPC server and the network card, in the Station Configuration Editor in accordance with the hardware configuration.

In this example you add the network card to Slot 1 and the OPC server to Slot 2.

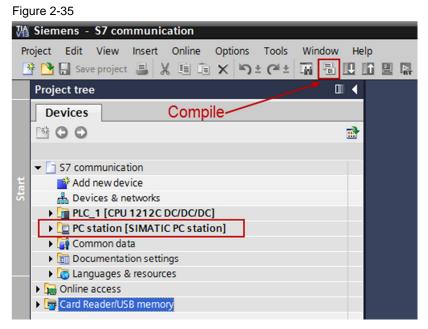
Then change the station name in the Station Configuration Editor. The name of the PC station must be identical in the TIA Portal and in the Station Configuration Editor.

The station name "PC station" is used in this example.

			/				_
Station:	PC station		Kode	: R	UN_P		
Index	Name	Туре	Ring	Status	Run/Stop	Conn	
1	🌃 IE general_1	IE General			0		
2	OPC Server_1	OPC Server			0	\$	
3							
4							
5							
6							Ξ
7							
8							
9							
10							
11							
12							
13							
14							
15							
16							
17							
18							
19							
20							-
	gnostic entry arrived!						
vew ulo	gnosiic entry anivea:						
	Add	Edit		Delete		Ring ON	
Sta	ation Name	Import Station				Disable Sta	tion

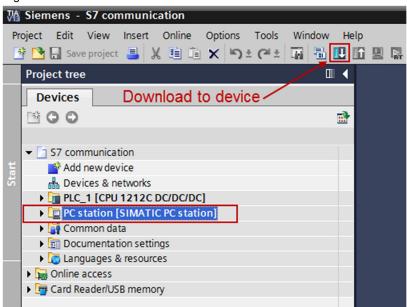
Compile

In the project navigation you mark the device folder of the PC station. Click the "Compile" button in the toolbar. The hardware configuration and the software of the PC station are compiled.



Download

In the project navigation you mark the device folder of the PC station. Click the "Download to device" button in the toolbar. The hardware configuration and the software are downloaded to the Station Configuration Editor.



The "Extended download to device" dialog opens. Check the settings below:

- PG/PC interface type
- PG/PC interface
- Connection with the subnet

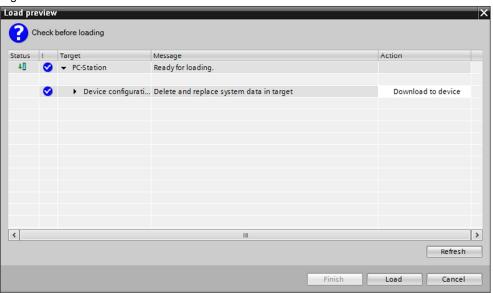
Under "Compatible devices in target subnet" you select the relevant device and click the "Load" button.

Figure 2-37						
Extended download to	device					×
	Configured access	nodes of "PC station	e.			
	Device	Device type	Slot	Туре	Address	Subnet
	IE general_1	IE general	1 X1	PN/IE	172.16.40.11	PN/IE_1
				PG/PC interface:	PN/IE	•
				PG/PC interface:		574L Gigabit N 🔻 🕏 國
			Connec	tion to subnet:	PN/IE_1	 ▼ ▼ ♥
				1st gateway:		
	Compatible device	s in target subnet:			SF	now all compatible devices
	Device	Device type	Туре		dress	Target device
	IE general_1 	IE general —	PN/IE PN/IE		2.16.40.11 cess address	Stationmanager —
Flash LED						
Online status information						<u>R</u> efresh
Connection establis		h address 172.16.40	.11.			•
Scan completed. 1 of a scan sector of the scan sect	compatible devices of					•
						Load <u>C</u> ancel

Note If the project has already been loaded once into the S7-1200 CPU, the "Load preview" dialog is opened immediately instead of the "Extended download to device" dialog.

The "Load preview" dialog opens. Click the "Load" button.





Commissioning of the PC station is completed after downloading of the configuration.

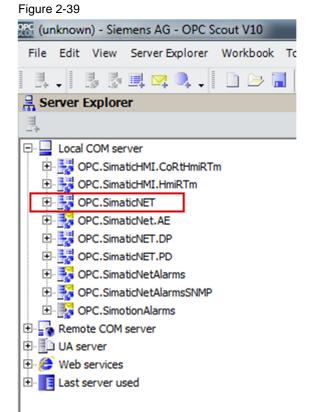
2.6 OPC Scout V10

In this example the OPC Scout V10 is used as the OPC client. Using the OPC client you can access the data of the S7-1200 CPU over the OPC server.

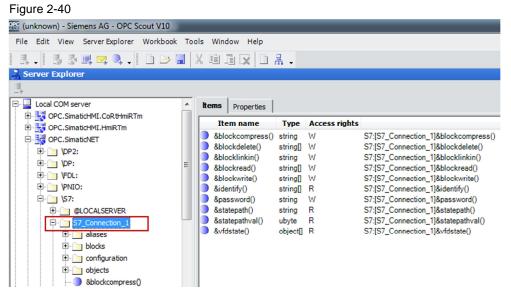
Start the OPC Scout V10 by means of the Windows menu "Start > All Programs > Siemens Automation > SIMATIC > SIMATIC NET > OPC Scout V10".

Establish connection to the OPC server

In the Server Explorer you double-click the "OPC.SimaticNET" item to establish a connection to the OPC server.



The configured S7 connection named "S7_Connection_1" is displayed in the Server Explorer under OPC.SimaticNET in the "\S7:" folder.



Create OPC items

Add the items below to the DA view.

Table 2-2

OPC item	Description
S7:[S7_Connection_1]MX1.0	By means of the OPC item you monitor and control the marker bit M1.0 in the S7-1200 CPU.
S7:[S7_Connection_1]MX1.1	By means of the OPC item you monitor and control the marker bit M1.1 in the S7-1200 CPU.
S7:[S7_Connection_1]MX2.0	By means of the OPC item you monitor the marker bit M2.0 in the S7-1200 CPU.
S7:[S7_Connection_1]DB1, X0.0	By means of the OPC item you monitor Bit 0.0 of the DB1 data block in the S7-1200 CPU.

≣ ¢ D	A view 1						
	Monitoring ON	Generate values O	N		Read 🖊	Write	
	ID	Display name	Туре	Access rights	Time stamp (UTC)	Value	Quality
a i	S7:[S7_Connection_1]MX1.0	-	bool	RW	01/13/2015 10:57:27.63	False	good
A	S7:[S7_Connection_1]MX1.1	-	bool	RW	01/13/2015 10:57:27.63	False	good
	S7:[S7_Connection_1]MX2.0	•	bool	RW	01/13/2015 10:57:27.63	False	good
A	S7:[S7_Connection_1]DB1X0.0	-	bool	RW	01/13/2015 10:57:27.63	False	good

Monitor OPC items

Click the "Monitoring ON" button to monitor the values of the OPC items. The values of the OPC items are displayed in the "Value" column.

ïgur	re 2-42						
<u>I</u> K D	A view 1						
	Monitoring ON	Generate values O	N		Read 🖍	Write	
	ID	Display name	Туре	Access rights	Time stamp (UTC)	Value	Quality
2	ID S7:[S7_Connection_1]MX1.0	Display name -	Type bool	Access rights	Time stamp (UTC) 01/13/2015 10:57:27.63		Quality
- 						False	
	S7:[S7_Connection_1]MX1.0	-	bool	RW	01/13/2015 10:57:27.63	False False	good

Write values

In the "New value" column you enter the value that you want to write to the S7-1200 CPU.

Enter the values below in the "New value" column (see <u>Table 2-3</u>). Click the "Write" button. The marker bit M2.0 and Bit 0 in DB1 are given the value "True".

The results of the write procedure are displayed in the "Value" column.

Table 2-3

OPC item	New value
S7:[S7_Connection_1]MX1.0	True
S7:[S7_Connection_1]MX1.1	False

	A view 1								
-	Monitoring ON	Generate values O	N		Read 🖊	Write			
	ID	Display name	Туре	Access rights	Time stamp (UTC)	Value	Quality	Result	New value
P a	S7:[S7_Connection_1]MX1.0	-	bool	RW	01/13/2015 11:15:23.80		good	S_OK	True
9	S7:[S7_Connection_1]MX1.1	-	bool	RW	01/13/2015 11:15:23.80	False	good	S_OK	False
<u>6</u>	S7:[S7_Connection_1]MX2.0	-	bool	RW	01/13/2015 11:15:23.80	True	good	S_OK	
G.	S7:[S7_Connection_1]DB1X0.0	-	bool	RW	01/13/2015 11:15:23.80	True	good	S_OK	

Enter the values below in the "New value" column (see <u>Table 2-4</u>). Click the "Write" button. The marker bit M2.0 and Bit 0 in DB1 are reset to the value "False". The results of the write procedure are displayed in the "Value" column.

Table 2-4

OPC item	New value
S7:[S7_Connection_1]MX1.0	False
S7:[S7_Connection_1]MX1.1	True

s, D	A view 1								
	Monitoring ON	Generate values O	N		Read 🖊	Write			
			_						
	ID	Display name	Туре	Access rights	Time stamp (UTC)	Value	Quality	Result	New value
24	ID S7:[S7_Connection_1]MX1.0	Display name	Type bool	Access rights RW	Time stamp (UTC) 01/13/2015 11:13:34.32		Quality good	Result S_OK	New value False
in N				-		False			
	S7:[S7_Connection_1]MX1.0		bool	RW	01/13/2015 11:13:34.32	False True	good	S_OK	False

3 Procedure for S7-1200 V4 and Higher

This chapter shows:

- The configuration of a SIMATIC S7-1200 and a PC station in the TIA Portal
- The configuration of an S7 connection for data exchange between the SIMATIC S7-1200 and the PC station

S7 access to optimized data blocks

With firmware V4.0 and higher the S7-1200 CPU supports S7 connections with access to optimized data blocks.

The OPC Server V12 and higher supports communication to an S7-1200 only via OPC UA (OPC Unified Architecture). Here you can use optimized data blocks or standard data blocks. Access to optimized data blocks is preset in the TIA Portal.

You need an OPC Client which supports OPC UA in order to access optimized data blocks via OPC UA and for using the OPC Server V12 or higher.

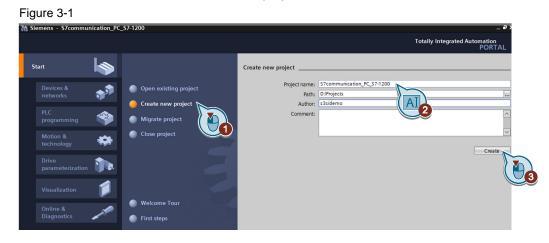
This entry shows how to configure an S7 connection between the S7-1200 V4 and the PC station in order to be able to use an OPC client which supports OPC UA.

Create a project

In Windows, select the command "Start > All Programs > Siemens Automation > TIA Portal V13" to start the TIA Portal.

- 1. In the Portal view, select the "Create new project" action.
- 2. Enter the project name in the appropriate field.

Click the "Create" button to create a new project.



Switch to Project View

Use the "Project View" link to switch to the Project View.



Figure 3-2

3.1 Configuration of the S7-1200

You configure your S7-1200 station in the TIA Portal. Then you create the user program and define which data is to be monitored over the S7 connection of the OPC server.

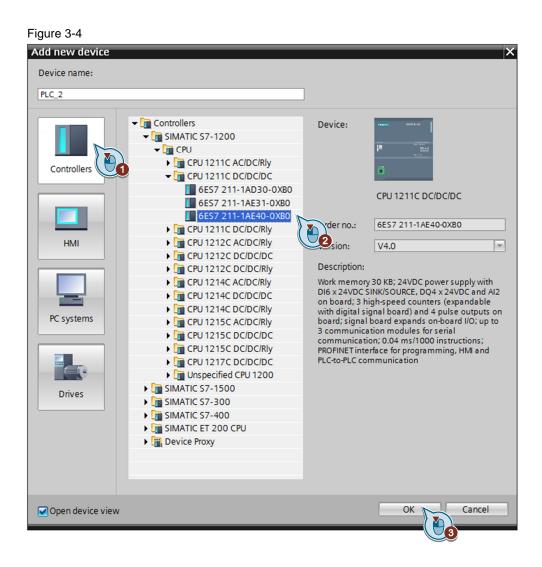
3.1.1 Configure the Hardware

Add an S7-1200 station

In the Project tree, double-click the "Add new device" item. The "Add new device" dialog opens.

VA	Siemens - S7communication_PC_S7-1200
	oject Edit View Insert Online Options Tools Window He
	Project tree 🔲 🕻
	Devices
	🖻 O O 🖻
	▼ S7communication_PC_S7-1200
Start	Add new device
5	📩 Devices & networl 🍋)
	▶ 🚰 PLC_1 [CPU 1211 C→ /DC/DC]
	C station [SIMATIC PC station]
	🕨 🥁 Common data
	Documentation settings
_	Languages & resources
	Image: Contract of the second seco
	Card Reader/USB memory
	Car card neadenoop memory

- 3. Click the "Controllers" button in the working area.
- 4. Go to "Controllers > SIMATIC S7-1200 > CPU" and select the required controller.
- 5. Click the "OK" button to add the selected S7-1200 CPU to your project.

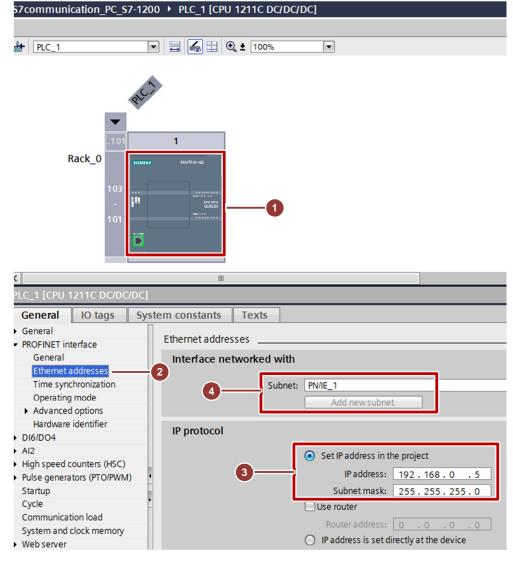


Define IP address and assign subnet

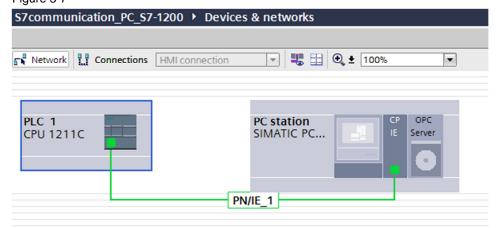
In the Project tree, double-click the "Devices and Networks" item. The Devices and Networks editor opens.

Figure 3-5 M Siemens - S7communication_PC_S7-1200 Project Edit View Insert Online Options Tools Window He ⊞ la X 与± @± 📑 📑 🔚 Save project - 🖪 🔃 Х **Project tree** Devices 🖻 O O 2 S7communication_PC_S7-1200 Add new device h Devices & networks • 1 PLC_1 [CPU 1211C D Dc, (ation] PC station [SIMATIC] 🕨 🧃 Common data

- 1. In the Network View or Device View of the Devices and Networks editor you mark the S7-1200 CPU.
- The properties of the S7-1200 CPU are displayed in the inspector window. Go to the "General" tab and in the area navigation you select the "PROFINET interface > Ethernet addresses" item.
- 3. In this example you enter the IP address 192.168.0.5 and the subnet mask 255.255.255.0 for the PROFINET interface of the S7-1200 CPU.
- 4. Assign a subnet to the PROFINET interface. Click the "Add new subnet" button to create a new subnet.



The connection between the subnet, PN/IE_1, for example, and the S7-1200 is now displayed in the "Network View" of the Devices and Networks editor. Figure 3-7



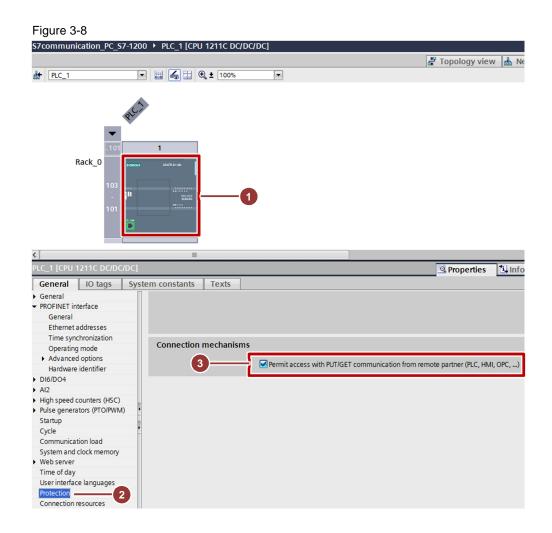
Permit access with PUT/GET communication from remote partner (PLC, HMI, OPC ...)

In this example the S7-1200 CPU is server for the S7 connection, in other words it participates passively in establishing the connection.

The PC station is client for the S7 connection, in other words the PC station actively establishes the S7 connection.

In the S7-1200 CPU you must permit the client-side access to the CPU data, which means that the communication services of the CPU are then no longer restricted. Proceed as follows.

- 1. In the Network View or Device View of the Devices and Networks editor you mark the S7-1200 CPU.
- 2. The properties of the S7-1200 CPU are displayed in the inspector window. Go to the "General" tab and in the area navigation you select the "Protection" item.
- 3. Enable the "Permit access with PUT/GET communication from remote partner (PLC, HMI, OPC ...)" function.



3.1.2 Create a User Program

Add a data block

In the project tree, navigate to the device folder of the S7-1200 CPU, "PLC_1 [CPU 1212C ...]", for example. The device folder contains structured objects and actions that belong to the device.

In the device folder you navigate to the "Program blocks" subfolder and doubleclick the "Add new block" action. The "Add new block" dialog opens.

Figure 3-9

Project tree	
Devices	
······································	
 S7communication_PC_S7-1200 	
📑 Add new device	
🛗 Devices & networks	
Device configuration	
😨 Online & diagnostics	
🗢 🚘 Program blocks	
📑 Add new block 🛌	
📲 Main [OB1] 🛛 🚺 🔪	
OPC_DATA [DB1]	
🕨 🙀 Technology objects	
External source files	
🕨 🔁 PLC tags	
E PLC data types	
Watch and force tables	
P loot Watch and loice tables	

- 1. Click the "Data block (DB)" button.
- 2. Enter the name of the data block.
- If the "Automatic" option is enabled, the number of the data block is assigned automatically.
 Enable the "Manual" option if you want to assign the desired number of the data block manually.
- 4. Apply the settings with "OK".

The data block DB1 "OPC_DATA" is created in this example.

Figure 3-10					
Add new block					×
Name:					
OPC_DATA					
	_				
	Type:	🧧 Global DB	•		
OB	Language:	DB	-		
Organization block	Number:	1			
DIOCK	3	🔿 Manual			
		 Automatic 			
	Description:				
Function block	Data blocks (DBs)	save program data.			
Tunction block					
FC					
Function					
Data block					
	More				
> Additional inform	nation				
Add new and open				ОК	Cancel

In the Properties of the data block, under "Attributes" you enable the "Optimized block access" option.

Data blocks with optimized access do not have a specifically defined structure. The data elements receive only one symbolic name in the declaration and no fixed address in the block. The elements are automatically arranged in the available memory area of the block so that there are no gaps in the memory. In this way the memory capacity is optimally used.

Tags in these data blocks are identified by their symbolic name. In order to address the tags you enter the symbolic names of the tags.

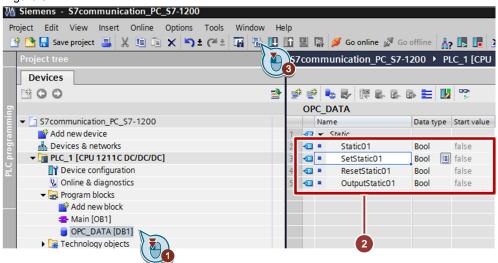
Figure 3-11	
OPC_DATA [DB1]	×
General Information Time stamps Compilation Protection Attributes Download witho	Attributes Only store in load memory Data block write-protected in the device Optimized block access
	OK Cancel

Define static tag in the data block

Define 4 static tags of the "Bool" data type in the DB1 "OPC_DATA".

- In the Project tree you go to the "Program Blocks" folder and double-click the data block DB1 "OPC_DATA". The data block DB1 "OPC_DATA" opens in the working area.
- 2. Insert 4 static tags of the "Bool" data type in the data block DB1 "OPC_DATA".
 - Static01
 - SetStatic01
 - ResetStatic01
 - OutputStatic01
- 3. Click the "Compile" button.

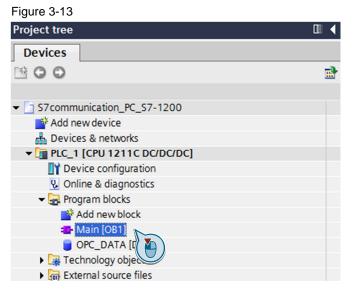
Figure 3-12



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Create Main [OB1]

In the "Program blocks" folder, you double-click the "Main [OB1]" block to open the corresponding dialog window.



Create the program as shown in <u>Figure 3-14</u>. The bit links are in the "Instructions" task card under "Basic instructions > Bit links".

Use drag-and-drop to add the normally open contact, the flip-flop and the Assignment to Network 1 of the "Main [OB1]" block.

Assign the tags assigned in <u>Table 3-1</u> to the flip-flop, to the normally open contact at inputs S and R of the flip-flop and to the assignment at output Q of the flip-flop.

Click the "Compile" button.

Symbolic name of the tag	Description		
"OPC_DATA".SetStatic01	SR flip-flop input S: Normally open contact		
"OPC_DATA".ResetStatic01	SR flip-flop input R: Normally open contact		
"OPC_DATA".Static01	SR variable		
"OPC_DATA".OutputStatic01	SR flip-flop output Q: Assignment		

Inication_PC_S7-1200 + PLC_1 [CPU 1211C DC/DC/DC] + Program blocks + Main [OB1] 🛛 🗕 🖬 🗮 🗡	Instructions	
	Options	
(# (# 2 = 🖉 = 🖉 = = 🖓 = = 🖓 😢 😡 🖉 🕼 🐨 🔢 🖂		
Block interface	> Favorites	
	✓ Basic instructions	
	Name	Description
▼ Block title: "Main Program Sweep (Cycle)"	🕨 🛄 General	
Comment		
	HI	Normally open contact [Sł
Network 1:	HI //	Normally closed contact [!
Comment	HI NOT	Invert RLO
	0()	Assignment [Shift+F7]
"OPC_DATA".	···()	Negate assignment
"OPC_DATA". Static01 "OPC_DATA".	(R)	Reset output
SetStatic01 SR OutputStatic01	(S)	Set output
	O SET_BF	Set bit field
	O RESET_BF	Reset bit field
	E SR	Set/reset flip-flop
"OPC_DATA".	E RS	Reset/set flip-flop
ResetStatic01	HI P	Scan operand for positive
R1	HI N	Scan operand for negative
	🗉(P)	Set operand on positive si

. . .

3.2 Configuration of the PC Station

Before you start configuring the PC station in the TIA Portal, determine or change the IP address of the network card via which the PC station is connected to the S7-1200. You enter the IP address and subnet mask of the network card when you configure the PC station in the TIA Portal.

Determine and change the IP address and subnet mask of the network card

In Windows you open the "Network and Sharing Center" and select the "Change adapter settings" function. Open the Properties dialog of the network card via which the PC station is connected with the S7-1200.

In this example the network card receives the IP address 192.168.0.10 and subnet mask 255.255.255.0.

ΓĮ	gure 3-15					
Ir	Internet Protocol Version 4 (TCP/IPv4) Properties					
	General					
	You can get IP settings assigned automatically if your network supports this capability. Otherwise, you need to ask your network administrator for the appropriate IP settings.					
	Obtain an IP address automatically					
	O Use the following IP address:					
	IP address: 192 . 168 . 0 . 10					
	Subnet mask: 255 . 255 . 255 . 0					
	Default gateway:					
	Obtain DNS server address automatically					
	Use the following DNS server addresses					
	Preferred DNS server:					
	Alternate DNS server:					
	Validate settings upon exit Advanced					
	OK Cancel					

NOTE The IP address configured for the PC station in the TIA Portal must match the IP address set in Windows.

If you are not using a router, then the IP addresses of the PC station and the S7-1200 CPU must be in the same subnet.

Setting the PG/PC interface

Go to the Control Panel and start the configuration program "Set PG/PC Interface": "Start > Settings > Control Panel > Set PG/PC Interface".

In the "Access Point of the Application" list box you select the access point "S7ONLINE".

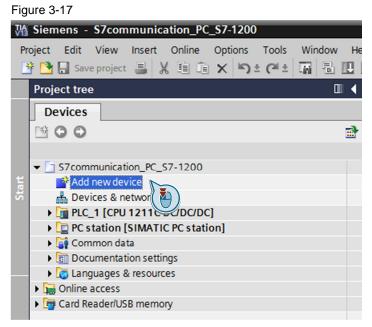
In the "Interface Parameter Assignment Used" list box you select the network card with TCP/IP to which the S7-1200 CPU is connected.

Set PG/PC Interface						
Access Path LLDP / DCP PNIO Adapter Info						
Access Point of the Application:						
S70NLINE (STEP 7)> Intel(R) 82579LM Gigabit Network Connection. T						
(Standard for STEP 7)						
Interface Parameter Assignment Used:						
Intel(R) 82579LM Gigabit Network Connection.	Properties					
CP5711.FWL_FAST_LOAD.1						
CP5711.MPI.1 <active></active>	Copy					
Imal Intel(R) 82579LM Gigabit Network Conne Imal Intel(R) 82579LM Gigabit Network Conne	Delete					
4 III >	Delete					
(Parameter assignment of your NDIS-CP						
withTCP/IP protocol (RFC-1006))						
ОК	Cancel Help					

Add a PC station

In the TIA Portal you open the project that contains the configuration for the S7-1200 station.

In the Project tree, double-click the "Add new device" item. The "Add new device" dialog opens.



- 1. Click the "PC systems" button in the working area.
- 2. Go to "PC systems > PC general" and select the "PC station" item.
- 3. Click the "OK" button to add a PC station named "PC Station" to your project.

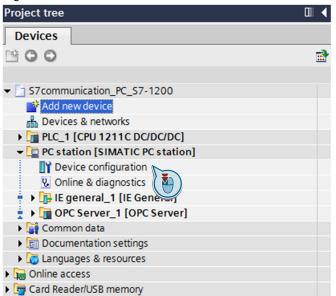
Figure 3-7	8
------------	---

Add new device			×
Device name:			
PC station			
Controllers HMI PC systems Drives	PC systems PC general PC station Industrial PCs SIMATIC S7 Em Controller SINUMERIK operator components SINUMERIK operator components SINUMERIK operator components SINUMERIK operator components User application SIMATIC HMI application User applications	Device: Order no.: Version: Description: SIMATIC PC st	SIMATIC PC station SIMATIC PC-Station V1.0 V ation
Open device view			OK Cancel

Open the "Device View" of the PC station in the Devices and Networks editor

In the Project tree, navigate to the device folder of the PC station, "PC Station [PC station]", for example. The device folder contains structured objects and actions that belong to the device.

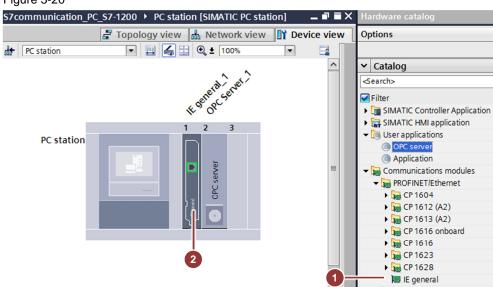
In the device folder double-click the "Device configuration" object to open the "Device View" of the PC station in the Devices and Networks editor.



Configure user application and communication module of the PC station

In the "Device View" of the PC station you configure and parameterize the modules of the PC station.

- 1. In the Hardware Catalog, the "Catalog" palette contains the user applications and communication modules which you can configure in the PC station. Mark the "IE General" communication module.
- 2. Using drag-and-drop you add the "IE General" communication module to Slot 1 of the PC station.



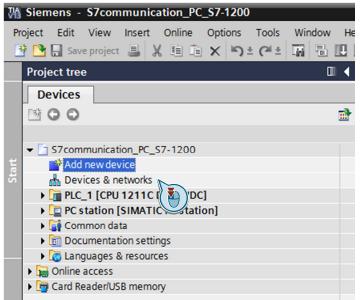
- 1. In the Hardware catalog you go to the "Catalog" palette and mark the user application "OPC Server".
- 2. In the "Information" palette you select the version "SW V12..." or higher for the OPC server. This ensures that an S7 connection is created later with access to optimized data blocks.
- 3. Add the "OPC server" user application to Slot 2 of the PC station.



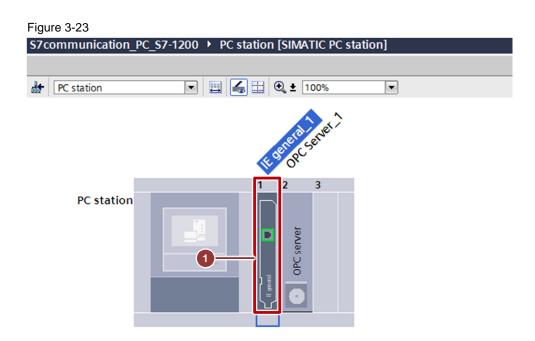
\$7 0	ommunication_PC_S7-1	1200 PC station [SIMATIC PC station]	▁▝▌▋▏	×	Hardware catalog
		🛃 Topology view 📠 Network view	/ 🛐 Device view	٦	Options
dt-	PC station	💌 🖽 🛃 🔍 ± 83%	- 🖬		
		Keaneral and the second	<u>~</u>		✓ Catalog
		eral ever			<search></search>
		K CREINC ST			🛃 Filter
		1 2 3			C general
	PC-Station				Image: SIMATIC Controller Application Image: SIMATIC HMI application
					let applications
		OPC server	1-	-	OPC server
					Application
					Communications modules
		ß	-	2	
			•	vice	
				data	
					✓ Information
					Device: OPC
					Server
					0
					OPC server
				1	Order no.: OPC Server
			2		Version: SW V12

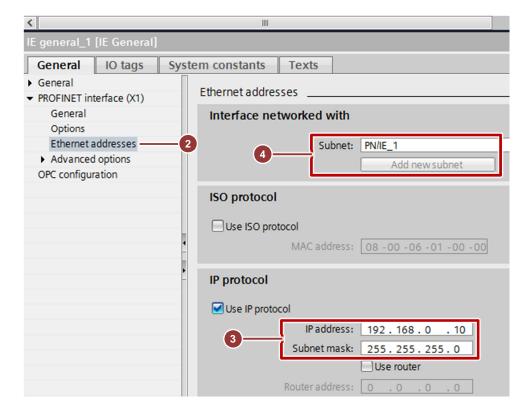
Define IP address and assign subnet

In the Project tree, double-click the "Devices and Networks" item. The Devices and Networks editor opens.



- 1. In the Network View or Device View of the Devices and Networks editor you mark the network card in the PC station.
- The properties of the network card are displayed in the inspector window. Go to the "General" tab and in the area navigation you select the "PROFINET interface > Ethernet addresses" item.
- 3. In this example you enter the IP address 192.168.0.10 and subnet mask 255.255.255.0 for the network card.
- 4. Select the subnet that you have already assigned to the S7-1200 CPU and assign it also to the network card of the PC station.



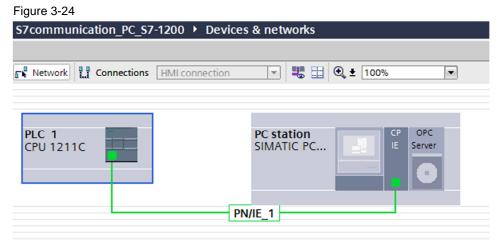


NOTE The IP address configured for the PC station in the TIA Portal must match the IP address set in Windows.

If you are not using a router, then the IP addresses of the PC station and the S7-1200 CPU must be in the same subnet.

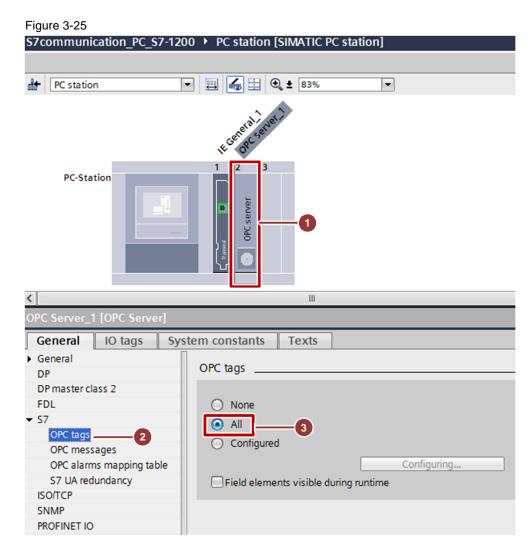
Entry-ID: 39960679, V1.2, 07/2015

The connection between the subnet, PN/IE_1, for example, and the S7-1200 and the PC station is now displayed in the "Net View" of the hardware and device editor.



Use symbols

- 1. In the Network View or Device View of the Devices and Networks editor you mark the OPC server in the PC station.
- The properties of the OPC server are displayed in the inspector window. Go to the "General" tab and in the area navigation you select the "S7 > OPC tags" item.
- 3. Select the "All" option.



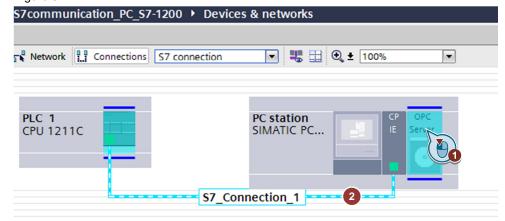
3.3 Configure the S7 Connection

3.3.1 Add the S7 Connection

In the Project tree, double-click the "Devices and Networks" item to open the Devices and Networks editor.

- 1. In the toolbar of the Network View, click the "Connections" icon to switch to the mode for setting the connections.
- 2. In the drop-down list box you select "S7 connection" as connection type.

- 1. In the graphical area of the Network View, click the OPC server in the PC station and connect it to the S7-1200 CPU.
- 2. In the Network View, the S7 connection is displayed in the graphical area. Figure 3-27



3.3.2 Display and Change Properties of the S7 Connection in the Inspector Window

- 1. In the table area of the Network view you open the "Connections" table. The S7 connection just configured is displayed.
- 2. Select the displayed S7 connection. The properties of the S7 connection are displayed in the inspector window.

General properties

- 3. Go to the "General" tab and in the area navigation you select the "General" item to display the connection path.
- 4. The S7 connection is between the OPC server and the S7-1200 CPU.

Network overview C	onnections I/O co	mmunicati VPN	1				
- Y Local connection name	Local end point	Local ID (hex)	Partner ID (hex)			Connection type	
S7_Connection_1	OPC Server_1	S7_Connection_1		PLC_1		S7 connection	
Connection_1 [S7 connection	on]	_	-	_		Rroperties	🗓 Info 追 🗓 Diagno
General IO tags Syst	em constants Tex	ts					
General Local ID	General						
Special connection prope	Connection						
Address details	connection						
OPC	Name:	S7_Connection_1					
	Connection path						
		Local			P	artner	
		OPC Server					
		•					
	End point:	OPC Server_1			P	'LC_1	
	Interface:	IE General_1, PROFINET	interface[IE1]	•	F	LC_1, PROFINET-Sch	nittstelle_1[X1 : PN(LAN)]
4	Interface type:	Ethernet			E	thernet	
	Subnet:	PN/IE_1			•	N/IE_1	
	Address	192.168.0.10			1	92.168.0.5	

- 1. Go to the "General" tab and in the area navigation you select the "Special connection properties" item.
- Here you see a display of the special connection properties of the local end point, "Active connection establishment", for example. You cannot change this option because it is a unilaterally configured S7 connection. In this example, the OPC server must actively establish the S7 connection. The communication partner, the S7-1200 CPU, participates passively in establishing the connection.

Network overview Co	nnections I/O co	ommunicati	VPN				
Local connection name	Local end point	Local ID (hex)		Partner ID (hex)	Partner		Connection typ
57_Connection_1	OPC Server_1	S7_Connection_1			PLC_1		S7 connection
S7_Connection_1 [S7 connectio	n]						Report
General IO tags Syste	em constants Te	xts					
General	Special connect	ion properties					
Local ID							
 Special connection properties Address details 	Local end poin	nt					
OPC 2							
		ction establishment					
	Send operation	ig mode messages					

- 1. Go to the "General" tab and in the area navigation you select the "Address details" item.
- 2. Here you have a display of the local end point, the partner end point and the TSAP of both end points.

	Network overview C	connections I/O co	mmunicati VPN				
view	Local connection name	Local end point	Local ID (hex)	Partner ID (hex) Pa	rtner	Connection type	
vork	S7_Connection_1	OPC Server_1	S7_Connection_1		PLC_1	S7 connection	
Neth							
				_			1
S 7	_Connection_1 [S7 connecti	on]				Roperties	🔄 Info
	General IO tags Sys	tem constants Tex	ts				
	General	Address details					
	Special connection properties						
	Address details		Local			Partner	
	OPC	End poir	nt: OPC Server_1			PLC_1	
		Rack/slo	ot:			0	
		Connection re	s				
		(he)	0:				
		(he)	k): P: SNOPCC0002000001			SIMATIC-ROOT-OTH	
		(he)				SIMATIC-ROOT-OTH	

3.4 Compile and Download the Configuration and User Program of the S7-1200

Table 3-2	
No.	Description
1.	In the Project tree you mark the device folder of the S7-1200 CPU. In the toolbar you click the "Compile" button. The hardware configuration and the software of the S7-1200 are compiled.
	M Siemens - S7communication_PC_S7-1200
	Project Edit View Insert Online Options Tools Window Help 😚 🎦 🔒 Save project 🚇 🔏 🗐 👔 🗙 🏷 ± 💜 ± 🖓 🔩 🖳 🔛 🔛 💋
	Project tree
	✓ S7communication_PC_S7-1200
	Add new device
	▶ [] PLC_1 [CPU 1211C DC/DC/DC]
	Le PC station [SIMATIC PC station] Eif Common data
	Documentation settings
	Languages & resources
	Online access
	Card Reader/USB memory

No.	Description
2.	In the Project tree you mark the device folder of the S7-1200 CPU. In the toolbar you click the "Download to device" button to download the project into the S7-1200 CPU.
	The "Extended download to device" or "Load preview" dialog opens automatically.
	Magnetic Signature Signatu
	Project Edit View Insert Online Options Tools Window Help
	📑 🎦 🔚 Save project 📕 🐰 🏢 🗎 🗙 🏷 🛨 (P ± 🗔 🖥 🖳 🛄 🖳 🌌
	Project tree
	Devices
	✓ S7communication_PC_S7-1200
	Add new device
	DEVICES & DEVICES
	C Station [SIMATIC PC station]
	🕨 🙀 Common data
	Documentation settings
	Languages & resources
	Online access
	Card Reader/USB memory

No.		Description						
3.	 Type of PG/PC i Connec PN/IE_1 Enable the Click the "S "Compatib 	PG/PC to the ollowing set the PG/PC i interface: Ne tion to interfa I, for example "Show all c Start search"	SIMATIC S7-2 tings: nterface: PN/IE etwork card of t ace/subnet: Su e ompatible devi ' button. The S target subnet:	E he l bne ces 7-1:	CPU F PG/PC t of the ' option 200 CP	S7-1200 CF	t. PU,	
	Extended download	to device		_	_			
		Configured access	_					
		Device PLC_1	CPU 1211C DC/D 1	lot X1	Type PN/IE	Address 192.168.0.5	Subnet PN/IE_1	
			Type of the PG/PC interf		PN/IE	2579LM Gigabit Netw	ork Connection 🔽 🕐 🔞	
			Connection to interface/subnet: PN/E_1 1st gateway:					
		Compatible device	s in target subnet:			2 Sho	wall compatible devices	
		Device PLC_1	Device type CPU 1211C DC/D	Type PN/IE		Address 192.168.0.5	Target device PLC_1	
	ar and p and p ar			PN/IE		Access address		
	C club (cp							
	Flash LED							
	Online status informatio		i.				Start search	
	Online status information	on retrieval completed					Start search	

No.	Description
No. 4.	 In the "Load preview" dialog you make the following settings. Select the "Stop all" action to stop the modules for downloading to the device. The device configuration is downloaded into the target device (S7-1200 CPU). The software and the text libraries are downloaded consistently to the target device (S7-1200 CPU). Click the "Load" button to start the download procedure.
	 Stop modules The modules are stopped for downloading to device. Stop all Device configurati Delete and replace system data in target Download to device Software Download software to device Consistent download Text libraries Download all alarm texts and text list texts Consistent download Text libraries Download all alarm texts and text list texts Consistent download Text libraries Download all alarm texts and text list texts Consistent download Text libraries Download all alarm texts and text list texts
5.	In the "Load results" dialog you make the following settings. 1. Enable the action "Start all". 2. Click the "Finish" button to terminate the download procedure. The status LED of the S7-1200 CPU indicates the "RUN" mode after downloading. 1. Coad results 1. Enable the action after downloading to device the "RUN" mode after downloading. 1. Coad results 1. Enable the action after downloading to device completed without error. 1. Enable the start modules after downloading to device. 1. Enable the start all

3.5 Compile and Download the PC Station Configuration

Open the Station Configuration Editor

In the Windows taskbar you double-click the "Station Configuration Editor" icon. The Station Configuration Editor opens.

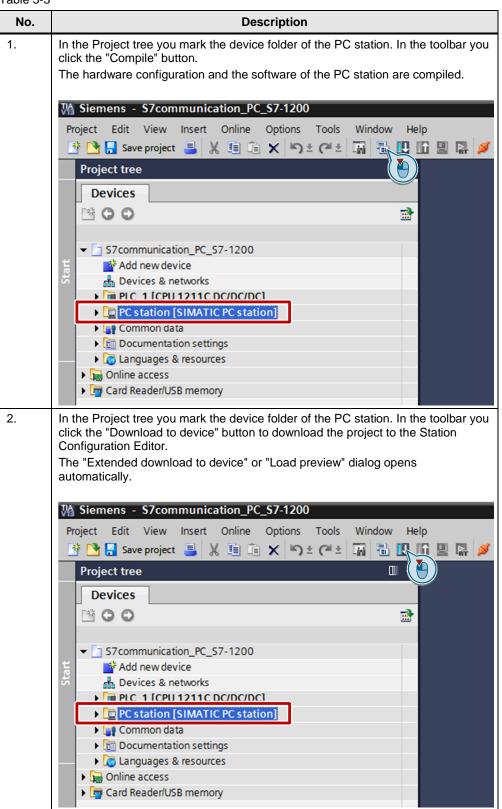


- 1. In the Station Configuration Editor you click the "Add..." button to add the modules, namely the OPC server and the network card, in accordance with the hardware configuration.
- 2. The modules are used at the following slots:
 - Slot 1: Network card
 - Slot 2: OPC server
- Click the "Station Name..." button to change the station names. The name of the PC station must be identical in the TIA Portal and in the Station Configuration Editor.
- 4. The station name "PC station" is used in this example.

·							-
Station:	PC station 4		Mode	e: R	UN_P		
Index	Name	Туре	Ring	Status	Run/Stop	Conn	•
2 1	🌃 IE general_1	IE General			0		
2	OPC Server_1	OPC Server		1	0	<u>ل</u>	
3							
4							
5							
6							Ξ
7							
8							
9							
10							
11							
12							
13							
14							
15							
16							
17							
18							
19							
20							-
	Add	Edit		Delete		Ring ON	
Sta	ation Name	Import Station				Disable Sta	tion

2 22 **—**:-





		Description						
i.	 path from the F Make the Type of PG/PC Connec PN/IE_ Disable th Click the " displayed From the ' card of the 	PG/PC to the following setti the PG/PC ir interface: Net ction to interfa 1, for example e "Show all co Start search" in the "Compa	PC station h ngs: iterface: PN/ work card of ce/subnet: S ompatible de button. The atible device	as to be s IE f the PG/F subnet of f evices" op network c s in targe	et. PC the PC station, tion. eard of the PC s t subnet:" list.			
	Extended download	Configured access n Device IE general_1	odes of "PC station" Device type IE general Type of the PG/PC into PG/PC into nection to interface/s	erface: 💹 Inte	E 192.168.0.1(IE El(R) 82579LM Gigabit Netv			
					2 Show all compatible devices			
		Compatible devices	in target subnet:		2 Sho	ow all compatible devices		
		Device	Device type	Туре	Address	Target device		
	Flash LED	-	-	Type PN/IE PN/IE				

No.				Description	
4.		dure evie	9.	log you click the "Load" button to star	t the download
	Status	1	Target	Message	Action
	+[]	\$	 PC station 	Ready for loading.	
		4	Different modules	Differences between configured and target modules (online)	
		٢	 Device configurati 	Delete and replace system data in target	Download to device
	<	_		III	>
				Finish	Refresh
5.	Comm config			Station is completed after downloadi	ng of the

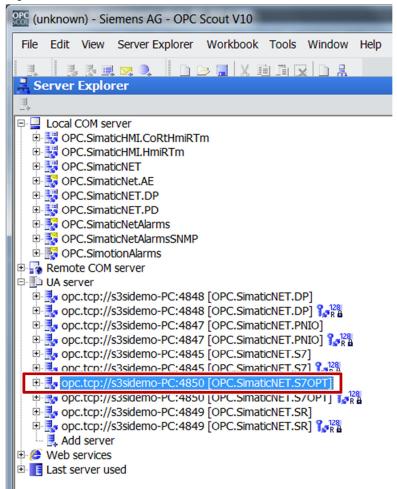
3.6 OPC Scout V10

In this example the OPC Scout V10 is used as the OPC client. Using the OPC client you can access the data of the S7-1200 CPU via the OPC server.

Start the OPC Scout V10 by means of the Windows menu "Start > All Programs > Siemens Automation > SIMATIC > SIMATIC NET > OPC Scout V10".

3.6.1 Establish Connection to the OPC Server

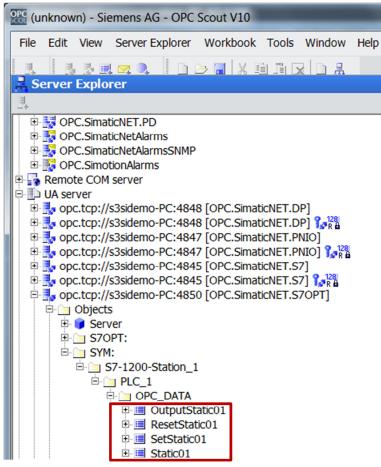
Start the UA server: opc.tcp://s3sidemo-PC:4850 [OPC.Simatic NET.S7OPT]. Figure 3-33



3.6.2 Symbolic Access

The symbols configured in the STEP 7 configuration (see section <u>3.2</u>) are displayed in the Server Explorer under "UA Server > opc.tcp://s3sidemo-PC:4850 [OPC.SimaticNET.S7OPT] > Objects > SYM: > S7-1200 Station_1 > PLC_1".

In this example we use the symbol table of the S7-1200 CPU, because an S7 connection to this CPU is configured for the OPC server. Here the symbols of the symbol table which refer to the data blocks (DB), markers, inputs and outputs, for example, are taken into account.



Create OPC items

Add the OPC items below to the DA view.

Table 3-4

OPC item	Description
SYM: S7-1200 station_1.PLC_1.OPC_DATA.Static01	Via the OPC item you monitor the "Static01" tag in the data block DB1 "DATA"
SYM: S7-1200 station_1.PLC_1.OPC_DATA.SetStatic01	Via the OPC item you monitor and control the "SetStatic01" tag in the data block DB1 "DATA"
SYM: S7-1200 station_1.PLC_1.OPC_DATA.ResetStatic01	Via the OPC item you monitor and control the "ResetStatic01" tag in the data block DB1 "DATA"

OPC item	Description
SYM: S7-1200 station_1.PLC_1.OPC_DATA.OutputStatic01	Via the OPC item you monitor the "OutputStatic01" tag in the data block DB1 "DATA"

•	Monitoring ON EL Gene	rate values	ON		Ш
	ID	Туре	Access rights	Value	New value
-	SYM: S7-1200-Station 1.PLC 1.OPC DATA.SetStatic01	bool	RW	False	
A	STM: 57-1200-Stauon T.PLC T.OPC DATA.SetStaucor	0001			
Ň	SYM: S7-1200-Station 1.PLC 1.OPC DATA.setStatic01 SYM: S7-1200-Station 1.PLC 1.OPC DATA.setStatic01	bool	RW	False	

Monitor OPC items

Click the "Monitoring ON" button to monitor values of the OPC items. The values of the OPC items are displayed in the "Value" column.

∎¢ D	re 3-36 A view 1				
•	Monitoring ON	rate values	ON		Ш
	ID	Туре	Access rights	Value	New value
.	ID SYM: S7-1200-Station 1.PLC 1.OPC DATA.SetStatic01	Type bool	Access rights	Value False	New value
A					New value
	SYM: S7-1200-Station 1.PLC 1.OPC DATA.SetStatic01	bool	RW	False	New value

Write values

 In the "New value" column you enter the value that you want to write to the S7-1200 CPU. Enter the values below in the "New value" column (see <u>Table 3-</u> <u>5</u>).

Table 3-5

OPC item	New value
SYM: S7-1200 station_1.PLC_1.OPC_DATA.SetStatic01	True
SYM: S7-1200 station_1.PLC_1.OPC_DATA.ResetStatic01	False

2. Click the "Write" button.

 The OPC items "SYM: S7-1200 Station_1.PLC_1.OPC_DATA.Static01" and "SYM: S7-1200 Station_1.PLC_1.OPC_DATA.OutputStatic01" are set to the value "true". The results of the write procedure are displayed in the "Value" column.

2	Monitoring OFF Gener	rate values	ON		Ш	Read	Wr
	ID	Туре	Access right	Value	New value	Quality	Disp
	SYM: S7-1200-Station 1.PLC 1.OPC DATA.SetStatic01	bool	RW	True	True 🛌	-	SetStatic01
	SYM: S7-1200-Station 1.PLC 1.OPC DATA.SetStatic01 SYM: S7-1200-Station 1.PLC 1.OPC DATA.ResetStatic01	bool bool		True False	True False	-	SetStatic01 ResetStatic01

1. Enter the values below in the "New value" column (see Table 3-6).

Table 3-6

OPC item	New value
SYM: S7-1200 station_1.PLC_1.OPC_DATA.SetStatic01	False
SYM: S7-1200 station_1.PLC_1.OPC_DATA.ResetStatic01	True

- 2. Click the "Write" button.
- 3. The OPC items "SYM: S7-1200 Station_1.PLC_1.OPC_DATA.Static01" and "SYM: S7-1200 Station_1.PLC_1.OPC_DATA.OutputStatic01" are reset to the value "false". The results of the write procedure are displayed in the "Value" column.

2.	Beobachten AUS	jenerieren	EIN		μι	Lesen
	ID	Тур	Zugriffsrechte	Wert	Neuer Wert	Qualität
À	SYM: S7-1200-Station 1.PLC 1.OPC DATA.SetStatic01	bool	RW	False	False	- SetStatic01
	SYM: S7-1200-Station 1.PLC 1.OPC DATA.ResetStatic01	bool	RW 3	True	True	- ResetStatic01
	SYM: S7-1200-Station 1.PLC 1.OPC DATA.Static01	bool	RW	False		- Static01
÷.						